Name:

at1121exam_practice: Radicals and Squares (v614)

Question 1

Simplify the radical expressions.

$$\sqrt{75} \qquad\qquad \sqrt{28} \qquad\qquad \sqrt{98}$$

$$\sqrt{5 \cdot 5 \cdot 3} \qquad\qquad \sqrt{2 \cdot 2 \cdot 7} \qquad\qquad \sqrt{7 \cdot 7 \cdot 2}$$
$$5\sqrt{3} \qquad\qquad 2\sqrt{7} \qquad\qquad 7\sqrt{2}$$

Question 2

Find all solutions to the equation below:

$$\frac{(x-8)^2 + 4}{2} = 52$$

First, multiply both sides by 2.
$$(x-8)^2 + 4 = 104$$

Then, subtract 4 from both sides.
$$(x-8)^2 = 100$$

Undo the squaring. Remember the plus-minus symbol.

$$x - 8 = \pm 10$$

Add 8 to both sides.
$$x = 8 \pm 10$$

So the two solutions are $x = 18$ and $x = -2$.

1

Question 3

By completing the square, find both solutions to the given equation. *You must show work for full credit!*

$$x^2 + 6x \;=\; 40$$

$$x^2 + 6x + 9 = 40 + 9$$
$$x^2 + 6x + 9 = 49$$
$$(x + 3)^2 = 49$$
$$x + 3 = \pm 7$$
$$x = -3 \pm 7$$
$$x = 4 \qquad \text{or} \qquad x = -10$$

Question 4

A quadratic polynomial function is shown below in standard form.

$$y \;=\; 2x^2 - 12x + 26$$

Express the function in **vertex form** and identify the **location** of the vertex.

From the first two terms, factor out 2 .
$$y = 2(x^2 - 6x) + 26$$
We want a perfect square. Halve -6 and square the result to get 9 . Add and subtract that value inside the parentheses.
$$y = 2(x^2 - 6x + 9 - 9) + 26$$
Factor the perfect-square trinomial.
$$y = 2((x - 3)^2 - 9) + 26$$
Distribute the 2.
$$y = 2(x - 3)^2 - 18 + 26$$
Combine the constants to get **vertex form**:

$$y = 2(x - 3)^2 + 8$$

The vertex is at point $(3, 8)$.